Classical angular tracking and intelligent anti-sway control for rotary crane system

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ABSTRACT
This paper presents investigations into the development of hybrid control schemes for sway suppression and rotational angle tracking of a rotary crane system. A lab-scaled rotary crane is considered and the dynamic model of the system is derived using the Euler-lagrange formulation. To study the effectiveness of the controllers, initially a classical controller which is collocated proportional-derivative (PD) controller is developed for control of rotary motion. This is then extended to incorporate a non-collocated fuzzy logic controller for control of sway angle of the pendulum. Implementation results of the response of the rotary crane system with the controllers are presented in time and frequency domains. The performances of the control schemes are assessed in terms of level of sway reduction, rotational angle tracking capability and time response specifications. Finally, a comparative assessment of the control techniques is presented and discussed.

KEYWORDS:
Rotary crane; sway control; collocated PD; noncollocated Fuzzy logic controller.

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